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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,621	10/14/2003	Stewart Frederick Bryant	50325-0823	5094

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EXAMINER	
PHAM, BRENDA H	

ART UNIT	PAPER NUMBER
2416	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/685,621	BRYANT ET AL.	
	Examiner	Art Unit	
	BRENDA PHAM	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,18-33 and 35-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-12,16,18-24,27-29,32,33 and 35-48* is/are rejected.

7)☒ Claim(s) *8,9,13-15,25,26,30 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/08/08;8/5/08;11/13/08;9/23/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-16, 18-33, 35-48 are pending in the application.

2. The indicated allowability of claims 1-16,18-33, 35-48 is withdrawn in view of the newly discovered reference(s) to Miles et al (US 2007/0038767 A1) and Kodialam et al (US 6,321,271 B1). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claims 1 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Miles et al (US 2007/0038767 A1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1 and 18, Miles et al discloses an apparatus and method of generating routing information in a data communications network having, as elements, nodes and links, the method comprising the steps of performed at a first network element of:

receiving at the first element information relating to a change in the network at a second network element, determining an affected set of network elements, wherein the affected set comprises network elements which are reachable from the second network element, determining a furthest network element in the affected set as located at a furthest distance from the first network element **([0040]"Each node on the network advertises, throughout the network, links to neighboring nodes and provides a cost associated with each link which can be based on any appropriate metric such as link bandwidth or delay and is typically expressed as an integer value. A link may have an asymmetric cost, that is, the cost in the direction AD along a link may be different from the cost in the direction BA. Based on the advertised information in the form of a link state packet (LSP) each node constructs a link state database (LSDB) which is a map of the entire network topology and from that constructs generally a single optimum route to each available node based on an appropriate algorithm such as, for example a shortest path first (SPF) algorithm. As a result a "spanning tree" is constructed, rooted at the node and showing an optimum path including intermediate nodes to each available destination node. Because each node has a common LSDB (other than when advertised changed are propagating around the network) any node is able to compute the spanning tree rooted at any other node as well as the "reverse spanning tree" sometimes termed a "sink tree" showing the optimum route for each node from which the node is reachable."**

identifying a sequence in which updating of routing information at each network element in the affected set should occur, And updating the routing information at the first element in sequence **([0053] "The first set of nodes reachable from node A (P-space) as shown in FIG. 4 comprises the set [FGWXYZ]. The Q-space from node C is [CEG] as can be seen in FIG. 5 and the Q-space for node D is [DEXYZ] as can be seen from FIG. 6")**

updating the routing information at the first element in sequence **([0076] "Various databases and tables storing the routing and forwarding information can be updated in any appropriate manner.")**

4. Claims 1-7, 10-12, 16-24, 27-29 and 32-36, 42-43, are rejected under 35 U.S.C. 103(a) as being unpatentable over Harper (US 7,058,016 B1) in view of Kodialam et al (US 6,321,271 B1).

Regarding claims 1, 18, Harper discloses an apparatus (claim 18) and method (claim 1) of generating routing information in a data communications network having, as elements, nodes and links, the method comprising the steps of performed at a first network element of:

receiving at the first network element information relating to a change in the network at a second network element **("new route information is received", Abstract)** determining a set of network elements affected by the change in the network **("evaluating existing routes of the node when new route information is received", abstract)**, identifying a sequence in which updating of routing information at each

element in the affected set should occur **(identifying a sequence by recalculating routes or the node only when the new route information improves at least one of the existing routes, Abstract)**, and updating the routing information at the first element in sequence **(updating network topology after the recalculating routes)**.

Harper does not disclose determining an affected set of network elements, wherein the affected set comprises network elements which are reachable from the second network element, determining a furthest network element in the affected set as located at the further distance from the first network element.

Kodialam et al, in the same field of endeavor, disclose a method and apparatus method for constrained shorted path routing method, using the reverse Dijkstra SPF algorithm.

It would have been obvious to those having ordinary skill in the art at the time of the invention was made to implement the method of constrained shortest path as taught by Kodialam et al, in Harper for routing subject to an acceptable delay constraint between nodes.

Regarding claims 2 and 19, Harper further teaches determining if the updated routing information differs from the routing information prior to the network change and maintaining the prior routing information at the first network element upon receipt of the information relating to the change if not.

Harper teaches "an incremental Dijikstra's algorithm can incorporate changes to the information about individual links in an optimized way, without

examining every node. Nodes with new route information (Link State Packets) are sorted into order of cost from the current node (the root). Each change in state is then evaluated. If it has no effect on existing routes it is ignored. If it improves existing routes, the routes are re-evaluated starting from the changed node. If existing routes are lost or made worse, the entire subtree from the affected link is re-evaluated. Each node is reattached at the best (lowest cost) point in the remaining spanning tree. If possible, and routes re-evaluated starting from the nodes that have been reattached. The effect is equivalent to running the full Dijkstra algorithm, at a much lower computation cost." (Col. 5, line 30-45).

Regarding claims 3, 20, 36, 43, in which the first network element updates after a delay derived from the updating sequence **("With link state routing, each router must discover its neighbors and learn their network addresses, measure the delay to each of its neighbors, construct a packet containing this information, send the packet to all other routers and computer the shortest path to every other router").**

Regarding claims 4 and 21, Harper further teaches determining, as an affected set, the set of nodes from which a target network element is reachable via the second network **(Nodes with new route information re-evaluated new routes starting form the changed node.)**

Regarding claims 5 and 22, Harper teaches the second network element is a link and the target network element is an adjacent node (see Figure 9).

Regarding claims 7, 10, 12, 24, 27, 29, wherein the delay is a function of the number of hops from the first network element to the furthest network element in the affected set (see column 5, line 30-50).

Regarding claims 16 and 33, Harper further teaches receiving a notification from a preceding network element in the sequence and updating the routing information upon receipt of the notification **(According the column 4, line 53-60, When router 16 is booted, its first task is to learn who its neighbors are. If accomplishes this goad by sending a special HELLO packet on each point-to-point link. The router 16 on the other end is expected to send back a reply telling who it is. Once the information needed for the exchange has been collected, the next step is for each router to build a packet containing all of this data. The packet (a Link State Packet) starts with the identity of the sender, followed by a sequence number...The link state database is synchronized by having the routers exchange LSPs to build the link state database...the router's links state database is thus updated.)**

Regarding claims 11 and 28, wherein the change in the second network element comprises a link cost increase and the affected set comprises the set of network

elements from the target network element is reachable prior to the network change **("The link state change results in bad news if the node's current path to the root becomes more expensive (including the case where it is no longer available at all). In this case there may be a better route via a different parent. (column 6, line 10-20).**

Regarding claim 29, wherein the change in the second network element comprises a link cost decrease and the affected set comprises the set of network elements from which the target network element is reachable after the network change **("For each link in current LSP the cost to the neighbor via this node is calculated (i.e., costToRoot plus the link cost), (step 272). If this cost is less than the neighbor's current cost (including the case where the neighbor is not yet reachable), the current node is set as the neighbor's only parent, its costToRoot is set, and its is added to Tent in the appropriate position(Col. 9-10, line 65-67, 1-10, respectively, also see figure 4).**

Regarding claims 35 and 42, Harper further teaches an apparatus for generating routing information in a data communications network having as elements links and nodes, the apparatus comprising one or more processors; a network interface communicatively coupled to the processor and configured to communication one or more packet flows among the processor and a network; and a computer readable medium comprising one or more sequence of instructions for generating routing

information which instructions, when executed by one or more processors, cause the one or more processors to generate routing information in a data communications network having as elements, nodes and links (see figure 2).

5. Claims 1-7, 10-12, 16-24, 27-29 and 32-36, 42-43, are rejected under 35 U.S.C. 103(a) as being unpatentable over Harper (US 7,058,016 B1) in view of Miles et al (US 2007/0038767 A1 B1).

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receiving at the first network element information relating to a change in the network at a second network element **("new route information is received", Abstract)** determining a set of network elements affected by the change in the network **("evaluating existing routes of the node when new route information is received", abstract)**, identifying a sequence in which updating of routing information at each element in the affected set should occur **(identifying a sequence by recalculating routes or the node only when the new route information improves at least one of the existing routes, Abstract)**, and updating the routing information at the first element in sequence **(updating network topology after the recalculating routes)**.

Harper does not disclose determining an affected set of network elements, wherein the affected set comprises network elements which are reachable from the

second network element, determining a furthest network element in the affected set as located at the further distance from the first network element.

Miles et al, in the same field of endeavor, disclose a method and apparatus method for constructing a backup route in a data communications network, using the reverse spanning tree algorithm.

It would have been obvious to those having ordinary skill in the art at the time of the invention was made to implement the method for constructing a backup route in a data communication network, such as that taught by Miles et al, in Harper for constructing a backup route from a source not around an adjacent component.

Regarding claims 2 and 19, Harper further teaches determining if the updated routing information differs from the routing information prior to the network change and maintaining the prior routing information at the first network element upon receipt of the information relating to the change if not.

Harper teaches "an incremental Dijikstra's algorithm can incorporate changes to the information about individual links in an optimized way, without examining every node. Nodes with new route information (Link State Packets) are sorted into order of cost from the current node (the root). Each change in state is then evaluated. If it has no effect on existing routes it is ignored. If it improves existing routes, the routes are re-evaluated starting from the changed node. If existing routes are lost or made worse, the entire subtree from the affected link is re-evaluated. Each node is reattached at the best (lowest cost)

point in the remaining spanning tree. If possible, and routes re-evaluated starting from the nodes that have been reattached. The effect is equivalent to running the full Dijkstra algorithm, at a much lower computation cost." (Col. 5, line 30-45).

Regarding claims 3, 20, 36, 43, in which the first network element updates after a delay derived from the updating sequence **("With link state routing, each router must discover its neighbors and learn their network addresses, measure the delay to each of its neighbors, construct a packet containing this information, send the packet to all other routers and computer the shortest path to every other router").**

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Regarding claims 11 and 28, wherein the change in the second network element comprises a link cost increase and the affected set comprises the set of network elements from the target network element is reachable prior to the network change **("The link state change results in bad news if the node's current path to the root becomes more expensive (including the case where it is no longer available at all). In this case there may be a better route via a different parent. (column 6, line 10-20).**

Regarding claim 29, wherein the change in the second network element comprises a link cost decrease and the affected set comprises the set of network elements from which the target network element is reachable after the network change **("For each link in current LSP the cost to the neighbor via this node is calculated (i.e., costToRoot plus the link cost), (step 272). If this cost is less than the neighbor's current cost (including the case where the neighbor is not yet reachable), the current node is set as the neighbor's only parent, its costToRoot is set, and its is added to Tent in the appropriate position(Col. 9-10, line 65-67, 1-10, respectively, also see figure 4).**

Regarding claims 35 and 42, Harper further teaches an apparatus for generating routing information in a data communications network having as elements links and nodes, the apparatus comprising one or more processors; a network interface communicatively coupled to the processor and configured to communication one or more packet flows among the processor and a network; and a computer readable medium comprising one or more sequence of instructions for generating routing information which instructions, when executed by one or more processors, cause the one or more processors to generate routing information in a data communications network having as elements, nodes and links (see figure 2).

Allowable Subject Matter

6. Claims 8, 9, 13-15, 25, 26, 30, 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Huai et al (US 6,928,484 B1) discloses method and apparatus for discovering edge-disjoint shortest path pairs during shortest path tree computation.

Kodialam et al (US 6,996,065 B2) disclose dynamic backup routing of network tunnel paths for local restoration in a packet network.

Rhodes (US 7,158,486 B2) discloses method and system for fast computation of routes under multiple network states with communication continuation.

Yoshiba et al (US 2005/0038909 A1) disclose static dense multicast path and bandwidth management.

Narvaez et al (US 6,704,320 B1) disclose dynamic algorithm for determining a shortest path tree between network nodes.

Narvaez-Guarnieri et al (US 6,098,107) disclose dynamic algorithms for shortest path tree computation.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brenda Pham whose telephone number is (571) 272-3135. The examiner can normally be reached on Monday-Friday from 9:00 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (571) 272-3155.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-2600.

November 15, 2008

/Brenda Pham/

Primary Examiner, Art Unit 2416